Review

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Should surgical outcomes be published?

Evelyn Chou[1], Hamid Abboudi[2], Mohammed Shamim Khan[2], Prokar Dasgupta[1] and Kamran Ahmed[1]

[1]Kings College London, Urology Centre, Guys Hospital, London SE1 9RT, UK
[2]Department of Urology, Guy's and St. Thomas' NHS Foundation Trust, London SE1 9RT, UK
Corresponding author: Kamran Ahmed. Email: kamran.ahmed@kcl.ac.uk

Summary

Despite publishing surgical outcomes being a positive step forwards in the progression of England's healthcare system, it has no doubt been faced with criticism and reservations. This review article aims to discuss the pros and cons of publishing individual surgical outcomes, as well as the challenges faced. Publishing outcomes requires data from a number of sources such as national clinical audits, hospital episode statistics, patient-reported outcomes, registers and information from revalidation. As yet, eight surgical specialties have begun publishing their data, including cardiac (coronary artery bypass graft, valve and aortic surgery), endocrine (thyroidectomy, lobectomy, isthmusectomy), orthopaedic (hip and knee replacement), urological (full and partial nephrectomies, nephroureterectomy), colorectal (bowel tumour removal), upper gastrointestinal (stomach cancer and oesophageal cancer removal, bariatric surgery), ear, nose and throat surgery (larynx, oral cavity, oropharynx, hypopharynx and salivary gland cancer removal), as well as vascular surgery (abdominal aortic aneurysm, carotid endarterectomy). However, not all procedures have been addressed. Despite the controversy surrounding the topic of publishing surgical outcomes, the advantages of reporting outcomes outweigh the disadvantages, and these challenges can be overcome, to create a more reliable, trustworthy and transparent NHS. Perhaps one of the main challenges has been the difficulty in collecting large amounts of clinically significant data able to quantify the performance of surgeons.

Introduction

One of the most vital services provided by the National Health Service is surgery. Millions of surgeries are performed each year in England across 3000 operating theatres, and an estimated £4.5 billion is spent on surgical costs alone.[1] Approximately, 10.8% of patients experience adverse hospital events, of which half are potentially preventable – these are not only detrimental to patients, but also incur extra costs of £1billion a year.[2] With these statistics in mind, on top of the increasing demand for surgery, it is not surprising that the idea of publishing individual surgical outcomes has come into the spotlight.

Surgical outcomes refer to data regarding operation results, including information about mortality and morbidity, recovery time, operative numbers and repeat rates.[3] As of 28 June 2013, almost 4000 surgeons began publishing their outcomes from the past three years. However, only about 20 procedures have been addressed as yet (Table 1).[3,4] Results so far have been positive, with surgeons performing at desirable standards in comparison to standards set in their specialties.[4]

However, it has been faced with criticism – while some surgeons are willing to have their outcomes published, some are not, on the basis of data quality being substandard or incomplete. This article aims to address whether surgeons should publish their outcomes, its pros and cons as well as the challenges faced.

Measuring outcome

The recording and publishing of surgical outcomes requires a reliable system of combining national clinical audits, Hospital Episode Statistics, registers, patient-reported outcomes and information from revalidation.[5,6]

National clinical audits are considered to be the gold standard in measuring outcomes.[6] It is defined as the measurement of quality of care and services, which are compared against set standards established by corresponding regulatory bodies. Where care is lacking, improvements are made to ensure good medical practice and optimum patient outcomes.[7] Improvements made to quality of care require tools able to measure it, but the defining of quality indicators has been slow. Traditionally, Donabedian's framework for quality is used in the pursuit of quality improvement (Figure 1).[8]

Table 1. An overview of surgical specialties, procedures included in surgical outcomes, and their respective associations.[10]

	Procedures covered	Surgical Specialty Associations
Cardiac surgery	Coronary artery bypass graft (CABG) Valve surgery Aortic surgery All cardiac surgery	Society for Cardiothoracic Surgery in Great Britain &Ireland
Colorectal surgery	Bowel tumour removal	The Association of Coloproctology of Great Britain and Ireland
Ear, nose and throat surgery	Larynx cancer removal Oral cavity cancer removal Oropharynx cancer removal Hypopharynx cancer removal Salivary gland cancer removal	British Association of Head & Neck Oncologists (BAHNO) Health & Social Care Information Centre (hscic)
Endocrine surgery	Thyroidectomy Lobectomy Isthmusectomy	British Association of Endocrine and Thyroid Surgeons (BAETS)
Orthopaedic surgery	Hip replacement Knee replacement	National Joint Registry Surgeon and Hospital Profile *In partnership with the British Orthopaedic Association, the British Hip society and the British Association for surgery of the knee*
Urological surgery	Open and laparoscopic nephrectomy Open and laparoscopic partial nephrectomy Open and laparoscopic nephroureterectomy	The British Association of Urological Surgeons (BAUS)
Upper gastrointestinal surgery	Stomach cancer removal Oesophageal cancer removal Bariatric surgery Gastric bypass Gastric banding Sleeve gastrectomy	Association of Upper Gastrointestinal Surgeons of Great Britain (AUGIS) National Bariatric Surgery Registry (NBSR)
Vascular surgery	Abdominal aortic aneurysm (AAA) Carotid endarterectomy	Vascular Services Quality Improvement Programme (VSQIP
Cardiac surgery	Coronary artery bypass graft (CABG) Valve surgery Aortic surgery All cardiac surgery	Society for Cardiothoracic Surgery in Great Britain &Ireland
Colorectal surgery Ear, nose and throat surgery	Bowel tumour removal Larynx cancer removal Oral cavity cancer removal Oropharynx cancer removal Hypopharynx cancer removal Salivary gland cancer removal	The Association of Coloproctology of Great Britain and Ireland British Association of Head & Neck Oncologists (BAHNO) Health & Social Care Information Centre (hscic)
Endocrine surgery	Thyroidectomy Lobectomy Isthmusectomy	British association of endocrine and thyroid surgeons (BAETS)
Orthopaedic surgery	Hip replacement Knee replacement	National Joint Registry Surgeon and Hospital Profile *In partnership with the British Orthopaedic Association, the British Hip society and the British Association for surgery of the knee*

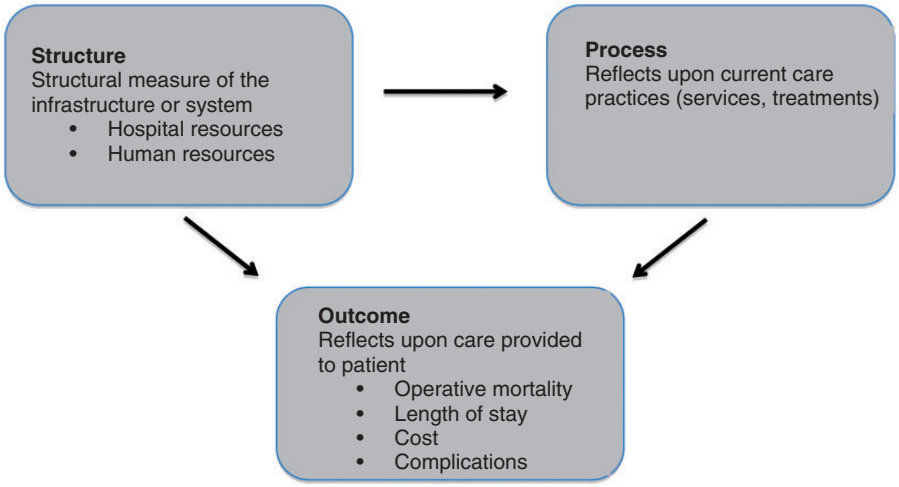
(continued)

Table 1. Continued.

	Procedures covered	Surgical Specialty Associations
Urological surgery	Open and laparoscopic nephrectomy Open and laparoscopic partial nephrectomy Open and laparoscopic nephroureterectomy	The British Associatiton of Urological Surgeons (BAUS)
Upper gastrointestinal surgery	Stomach cancer removal Oesophageal cancer removal Bariatric surgery Gastric bypass Gastric banding Sleeve gastrectomy	Association of Upper Gastrointestinal Surgeons of Great Britain (AUGIS) National Bariatric Surgery Registry (NBSR)
Vascular surgery	Abdominal aortic aneurysm (AAA) Carotid endarterectomy	Vascular Services Quality Improvement Programme (VSQIP

Note: However, there are no standard grading systems in place. Having a standardised system could potentially improve patient care in a number of ways – characterisation of surgical technique-specific morbidity, comparison of techniques, accurate portrayal of procedural-specific risk against other options and early detection of complications.

Figure 1. Donabedian's quality framework.



Hospital Episode Statistics refer to the statistics and data regarding mortality and postsurgical complications (Tables 2–4), duration of hospital stays and repeated admissions and operations. This thus indirectly indicates the standards of care and surgical activity.[6]

Patient-reported outcomes include patient feedback of operations performed[5] regarding their interpretations and opinions of their ailment, surgery and quality of care. Ideally, patient-reported outcomes should improve public opinion of healthcare services and professionals, and build trust and reliability.[8]

Revalidation refers to the critical appraisal of surgeons every five years to ensure fitness to practice. Information used for revalidation thus gives an indication of their outcomes.[6]

Ideally, outcome measures ought to be precise, consistent, validated, well-timed and simple to quantify.[9]

Outcomes in different specialties

Previously, the only specialty publishing surgical outcomes was cardiothoracic surgery, specifically regarding coronary artery bypass graft operations, compiled by the Society for Cardiothoracic Surgery in Great Britain and Ireland. The driving force was the public inquiry into the Bristol Royal Infirmary regarding

Table 2. A list of the criteria proposed by Martin et al. (2002) that should be met when reporting complications.[3]

Criteria	Requirement
Method of accruing data defined	Prospective or retrospective accrual of data are indicated
Duration of follow-up indicated	Report clarifies the time period of postoperative accrual of complications such as 30 days or same hospitalisation
Outpatient information included	Study indicates that complications first identified following discharge are included in the analysis
Definition of complications provided	Article defines at least one complication with specific inclusion criteria
Mortality rate and causes of death listed	The number of patients who died in the postoperative period of study are recorded together with cause of death
Morbidity rate and total complications indicated	The number of patients with any complication and the total number of complications are recorded
Procedure-specific complications included	
Severity grade utilised	Any grading system designed to clarify severity of complications including major and minor is reported
Length of stay	Median or mean length of stay indicated in the study
Risk factors included in the analysis	Evidence of risk stratification and method used indicated by study

Table 3. A list of classification systems available for reporting surgical complications.[10]

Classification	Clinical validation	Simplicity	Severity grading
Clavien-Dindo	Yes	Easy	I–V
Memorial Sloan-Kettering Cancer Centre	Yes	Easy	5
Accordion	No	Easy	
Contracted			4
Extended			6
National Surgical Quality Improvement Program	Yes	Complex	Major/ minor
National Cancer Institute – Common Toxicity Criteria	Yes	Complex	5

Note: In this way, it can be assured that the reporting of surgical complications and outcomes is reliable and comparable across the board.

high mortality rates in paediatric cardiothoracic surgery. Due to fundamental flaws of the system, patients were not receiving the care they deserved and major issues included the lack of leadership, insight, responsibility and set standards for comparison. The Kennedy report emphasised the importance of providing clinical outcome data to patients, and thus all paediatric cardiac surgery units were required to participate in the Central Cardiac Audit Database (CCAD). Between 1985 and 2002, mortality rates of paediatric cardiac surgery dropped significantly (75%), showcasing the progress made. It was also recognised that information on patients' past experiences is important to prospective patients. Cooperation between the secretary state of health, royal colleges, professional societies and patient representatives was required in the undertaking of clinical audits, to collect national data regarding performance quality of consultants.[11]

Since then, seven other surgical specialties (vascular, endocrine, orthopaedic, urological, colorectal, upper gastrointestinal and ear, nose and throat

Table 4. The revised and validated Clavien-Dindo grading system for classifying surgical complications.[10]

I	Any deviation from the normal postoperative course without the need for pharmacologic treatment or surgical, endoscopic and radiologic interventions. Acceptable therapeutic regimens are drugs such as antiemetics, antipyretics, analgesics, diuretics, and electrolytes, and physiotherapy. This grade also includes wound infections opened at the bedside
II	Requiring pharmacologic treatment with drugs other than those allowed for grade I complications. Blood transfusions and total parenteral nutrition are also included
III	Requiring surgical, endoscopic or radiologic intervention
IIIa	Intervention not under general anaesthesia
IIIb	Intervention under general anaesthesia
IV	Life-threatening complication (including central nervous system complications: brain haemorrhage, ischaemic stroke, subarachnoid bleeding, but excluding transient ischaemic attacks) requiring intermediate care/intensive care unit management
IVa	Single-organ dysfunction (including dialysis)
IVb	Multiorgan dysfunction
V	Death of a patient
Suffix 'd'	If the patient suffers from a complication at the time of discharge, the suffix 'd' (for disability) is added to the respective grade of complication. This label indicates the need for a follow-up to evaluate the complication fully

Table 5. Summary of pros and cons of publishing surgical outcomes.

Pros	Cons
Increased transparency and trust of patients in their doctors	Outcomes may be intrinsically poor, misrepresenting surgical outcomes
Reinforcement of the practice of patient-centred care	Patients may not understand the limitations of publishing outcomes
Surgeons are better able to compare surgical standards against colleagues	May result in the loss of skilled surgeons
Has been shown to reduce surgical mortality rates	Could potentially lead to false complacency
Consultants to pay closer attention and provide greater supervision to their juniors	Consultants may be less willing to involve trainee surgeons in higher-risk cases
A method of measuring clinical effectiveness	Surgeons may be afraid to take on more complex surgical cases

surgery) (Table 1) have started to publish their outcomes, led by the Healthcare Quality Improvement Partnership.[3] Data are collected and analysed by their respective associations to specify an appropriate level of care and outcome, allowing outliers to be identified and resolved, by providing support or extra training.[4]

However, not all specialties and procedures have been addressed, representing one of the many challenges faced – difficulty in identifying the most appropriate and significant data able to represent surgical skills in some specialties.[12]

In light of the increasing number of minor surgeries performed by GPs, a community-based surgery audit (CBSA) has been introduced to measure quality. Surgeries include skin lesion removal, and excisions of flaps and skin grafts under local anaesthesia. The CBSA is still in its early phases, and is not widespread among practitioners but is

expected to be made available to more practitioners by early 2014.[13]

Advantages of reporting outcomes

One of the greatest advantages of publishing surgical outcomes is increased transparency and trust in doctors due to assurance of quality and accountability. Patients have greater access to surgical data and are empowered to choose the consultant and hospital they want responsible for their care, thus incorporating greater patient choice.[14] Increased autonomy seems to be indicative of better health outcomes and patient satisfaction.[15]

Surgeons are better able to compare their surgical standards using national databases and are able to track their progress, which is particularly useful when an operation is first introduced (by plotting a learning curve). Multi-institutional research can be conducted, where the same procedure is performed using different methods – to determine which confers greater benefits. Publications hence create common ground for the estimation and improvement of surgical skills[5] and provide early indications of potential problems, allowing early intervention, to improve surgical standards . . .

Reporting outcomes has also been shown to reduce surgical mortality rates. However, it is not certain as to what extent publishing outcomes has impacted the already declining rates.[16]

As only consultant outcomes are published, this may lead to the performance of trainee surgeons being reflected in their outcomes, which could prompt consultants to provide greater supervision to their juniors.[16] Contrary to this, training may suffer if there is risk of poorer outcomes being reported under a consultant's name.

Additionally, publishing outcomes helps to measure clinical effectiveness, giving an idea of the cost effectiveness of the endeavors of the National Health Service. Governments would be better able to decide how tax revenue is spent in healthcare.[5] Hospitals with better clinical outcome attract more patients, which subsequently increases operative numbers, and thus increase their financial rewards. Publishing outcomes is also a good measure for pay-for-performance programmes. For example, the Advancing Quality Programme was implemented to determine individual hospital performances, and depending on how well they fared in comparison to others; each received different bonuses.[17]

Disadvantages of reporting outcomes

Outcomes may be intrinsically poor in certain operations, producing misleading results and instill fear and anxiety in patients, deterring them from seeking help. Patients may also fail to understand the limitations of surgical outcomes, such as basic mortality rates, which may not necessarily reflect true surgical performance due to other contributing factors. These include patient co-morbidities, case complexity and anaesthetic risk.[18] Misinterpretations of outcomes may cause patients to lose their faith in the healthcare system.[19] It is therefore vital that outcomes reflect procedure-specific complications and not factors such as drug errors or other mistakes unrelated to the surgery.

Some surgeons have shunned the idea of public outcome reporting, and it may put them off operating on high-risk cases. For instance, implementation of outcome reporting by the Society for Cardiothoracic Surgery (SCTS) prompted some surgeons to resign[16] and may consequently result in the loss of skilled surgeons.

False complacency may arise due to limitations in the ability of outcomes to represent performance. For example, some surgeons may perform fewer operations per year and due to the poor statistical power, identifying those with high mortality rates would be more challenging. Conversely, not all surgeons recognised as outliers will actually be performing poorly[20] which may reduce their self-esteem and confidence.

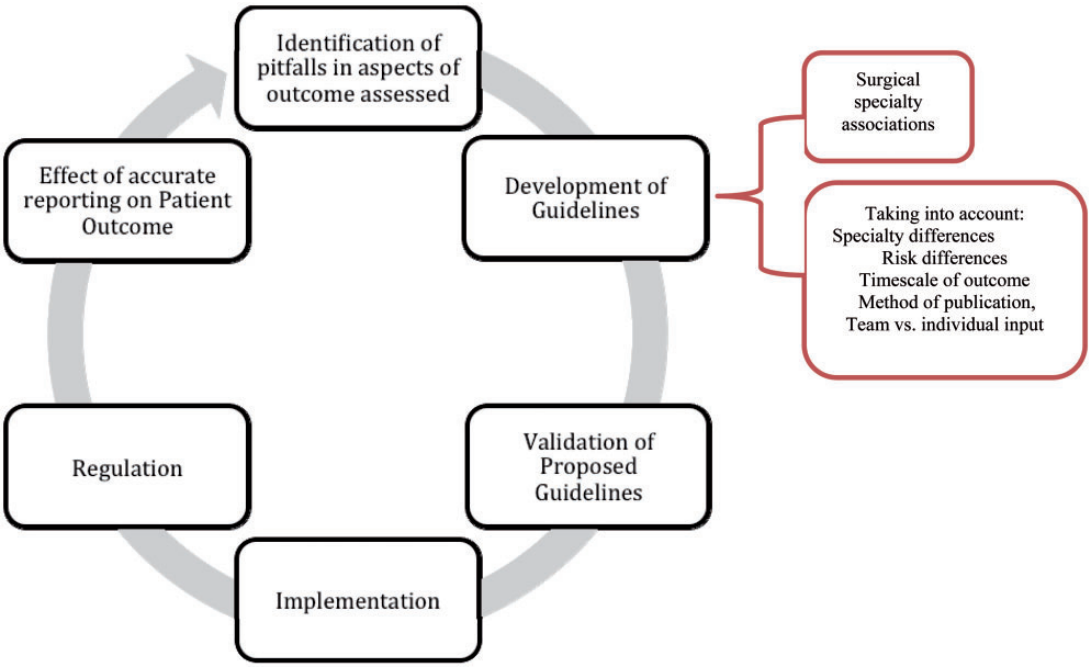
Another disadvantage is that surgeons may be afraid to take on complex surgical cases to reduce their risk of poor outcomes. Higher-risk patients may thus be less likely to find a surgeon willing to operate on them. Opportunities may be lost as challenging cases bring new learning opportunities, which bring about novel research.

Tackling challenges faced in reporting outcomes

Difficulties exist in finding methods to define and measure outcomes across all surgical specialties to generate credible data that are clinically meaningful, as no single method would be suitable across all surgical specialties.[14] Some surgical audits in place are still in early stages of development, and require further improvement.[19] To tackle this, commissioners of the National Health Service Board in the UK are expected to have collaborated ways of gathering patient and carer feedback in 'real time' by 2015, across the whole range of services by asking if they would recommend that service to their loved ones. Additionally, 'core clinical data' would be collected to aid outcome analysis across the range of care pathways.[14]

Outcome reporting needs to be standardised within a specialty to ensure comparability. There should also be a framework in place for the

Figure 2. Suggested framework for the development and implementation of surgical outcome reporting guidelines.



development and implementation of surgical outcome reporting guidelines (Figure 2). Some surgeons take on more complicated cases involving high-risk patients and therefore will encounter more complications.[14] To allow fair comparison of surgeons within and across different specialties, these factors should be taken into consideration during analysis. This highlights the importance of case-mix statistical adjustment, which addresses the differences in patient factors[20] that are commonly grouped according to the American Society of Anaesthesiologists classification of physical health. To prevent misleading outcomes due to low operational rates, several methods have been suggested. One method is that only outcomes that are fairly frequent should be used. Statistical power should also be taken into consideration when identifying outliers. With low operating numbers, confounding factors may have a greater impact on patient outcome than the skills of the surgeon. Statistical power refers to the chance that a poorly performing surgeon will be detected as an outlier, and is calculated by taking into account the expected number of deaths which is calculated by combining the number of procedures performed and mortality.[21]

Additionally, some audit data previously collected were not designed for publication purposes and may contribute to published outcomes being misleading. In such cases, the HQIP has provided explanations to accompany the data, which should be taken into account during interpretation.[19] There may be a need for additional audits to be put in place.

Another factor is that surgical outcomes are not solely dependent on the consultant as other members of the operating team also contribute. It is thus important that team-level data are published as well to reflect the complex interplay of the multi-disciplinary team.[4]

Conclusion

The benefits of reporting patient outcomes seem to outweigh the disadvantages, and they should be published. Despite criticisms faced, publishing outcomes certainly appears to be the way forward to patient-centredness in surgery and has been described as 'the beginning of a new era for openness in medicine' by Norman Williams, president of the Royal College of Surgeons.

Public reporting represents a dynamic relationship between the actions and reactions of all individuals involved– patients, surgeons, healthcare managers and the government, with its purpose balanced between its regulatory and educational roles.[16] The pressing question now is whether publishing outcomes will bring about the improvement in quality as predicted. Ultimately, it is hoped that public reporting will lead to better outcomes, following the dictum of the British philosopher Jeremy Bentham that the more we are watched, the better we behave.

Key messages

- Publishing outcomes requires the combination of data from a number of sources such as national clinical audits, hospital episode statistics, patient reported outcomes, registers and information from revalidation.
- As yet, eight surgical specialties have begun publishing their data, including cardiac, vascular, endocrine, orthopaedic, urological, colorectal, upper gastrointestinal, and ear, nose and throat surgery, each covering a number of procedures.
- One of the main factors holding this initiative back is the difficulty in taking into account the complexity of different cases across the numerous specialties, to produce clinically valid results.
- The advantages of reporting outcomes outweigh the disadvantages, and these challenges can be overcome, to create a more reliable, trustworthy and transparent NHS.

Declarations

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